

# PA-STARNet Briefing

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*Briefing in support of testimony for the  
Joint Communications and Technology  
and Emergency Preparedness  
Committees of the Pennsylvania Senate*

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# PA-STARNet Briefing

## *Original Legislation*



Initiated by Pennsylvania Legislative Act 148 (1996), it provided funding for a “communication and information infrastructure, including approximately 200 sites located throughout this Commonwealth for transmission of voice and data communication connected by a digital microwave system to form a statewide mobile radio network...”

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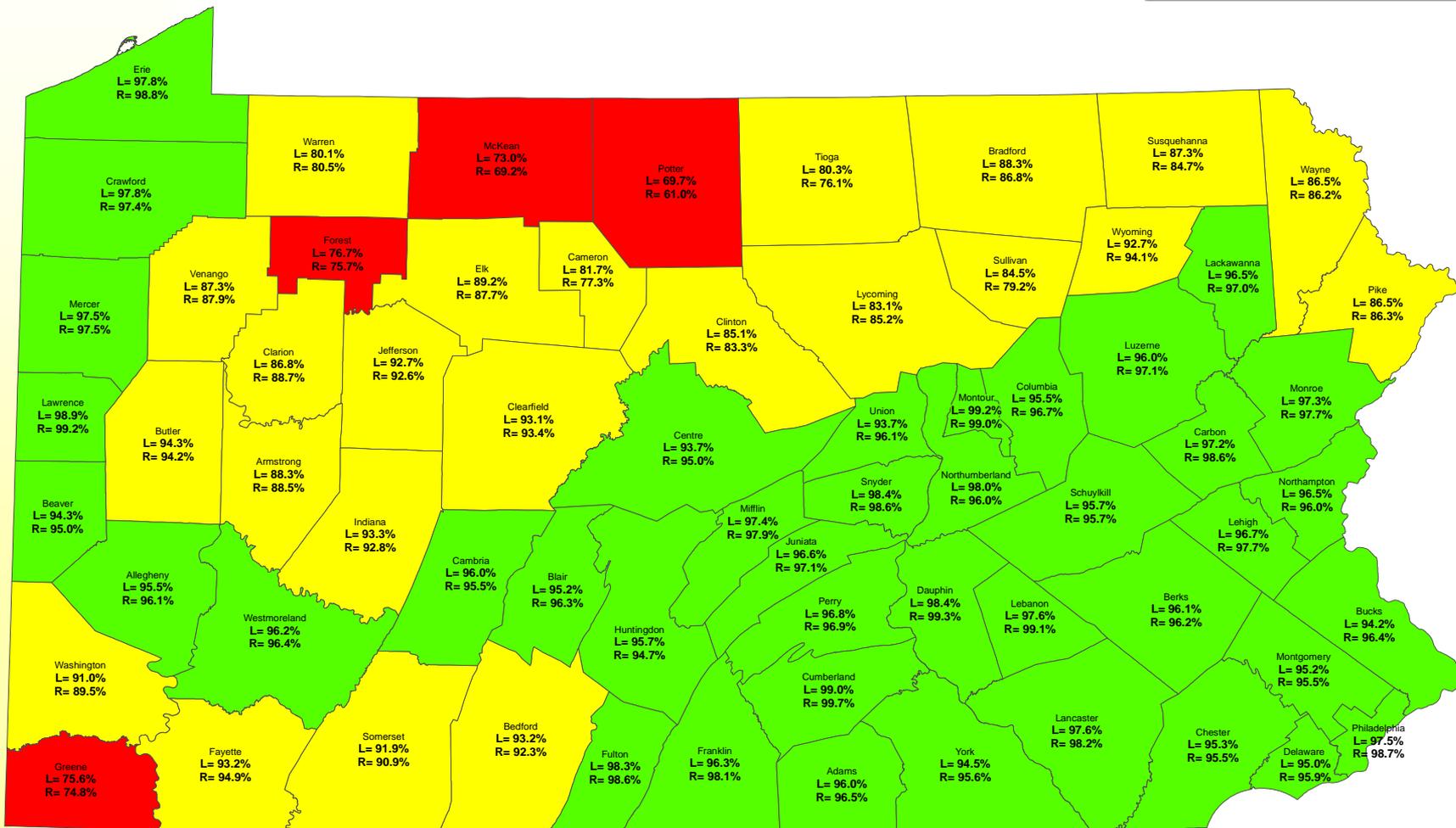


## *Status at end of August 2007*

- 14,825 registered radios
- 3,421,247 Push-to-Talks during month
- 17 state agencies using PA-STARNet or in transition
- 41,275 square miles of radio coverage (91.1% of land area and inland waterways)
- 231 high-profile tower base stations constructed and operational—tower site construction complete at end of 2007
- 314 low-profile microcell sites constructed and operational
- Up to 1,100 sites in final design (estimated)  
*Over five times the number of sites originally envisioned in Act 148 of 1996*

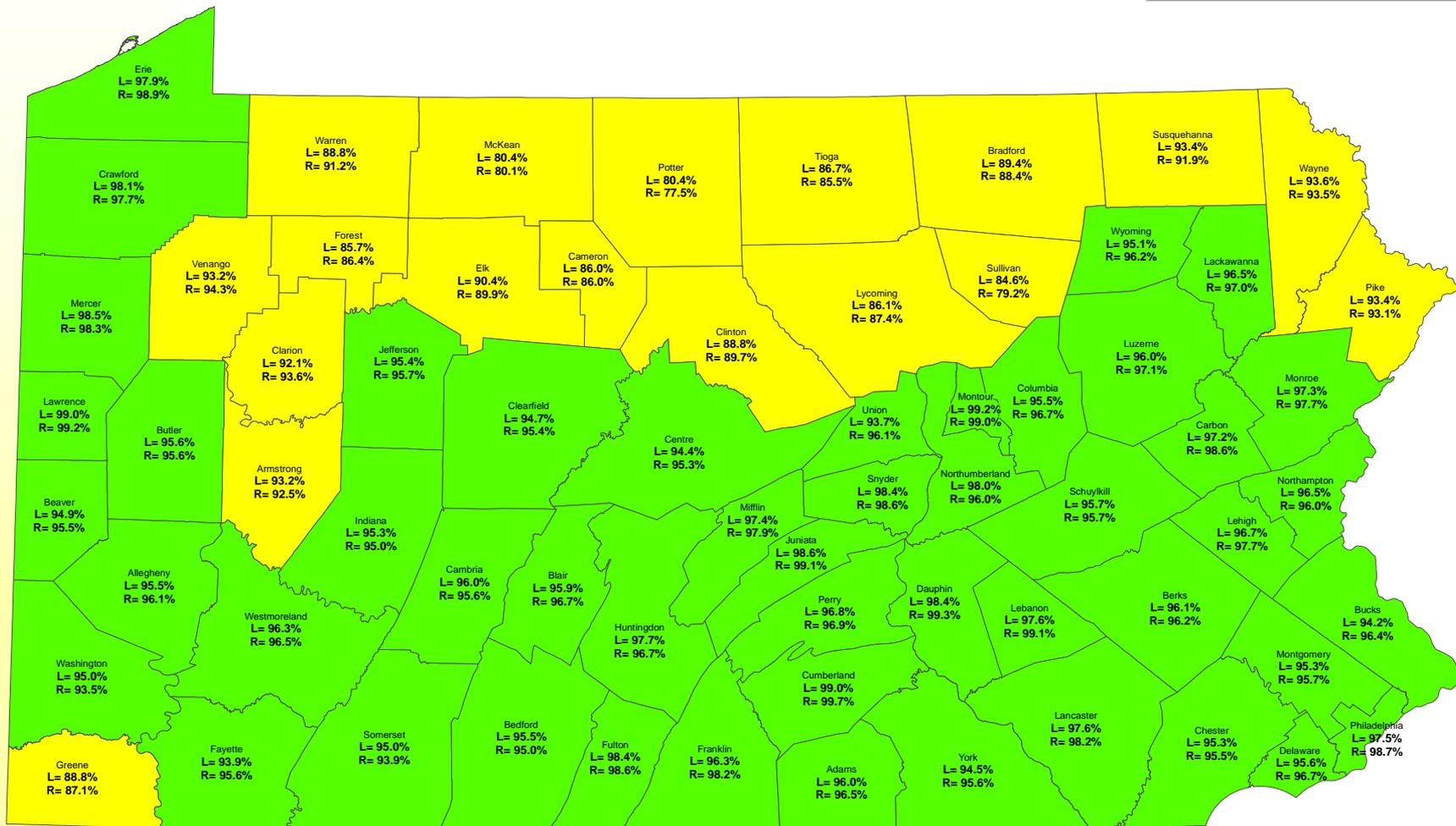
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## Current Operational Coverage



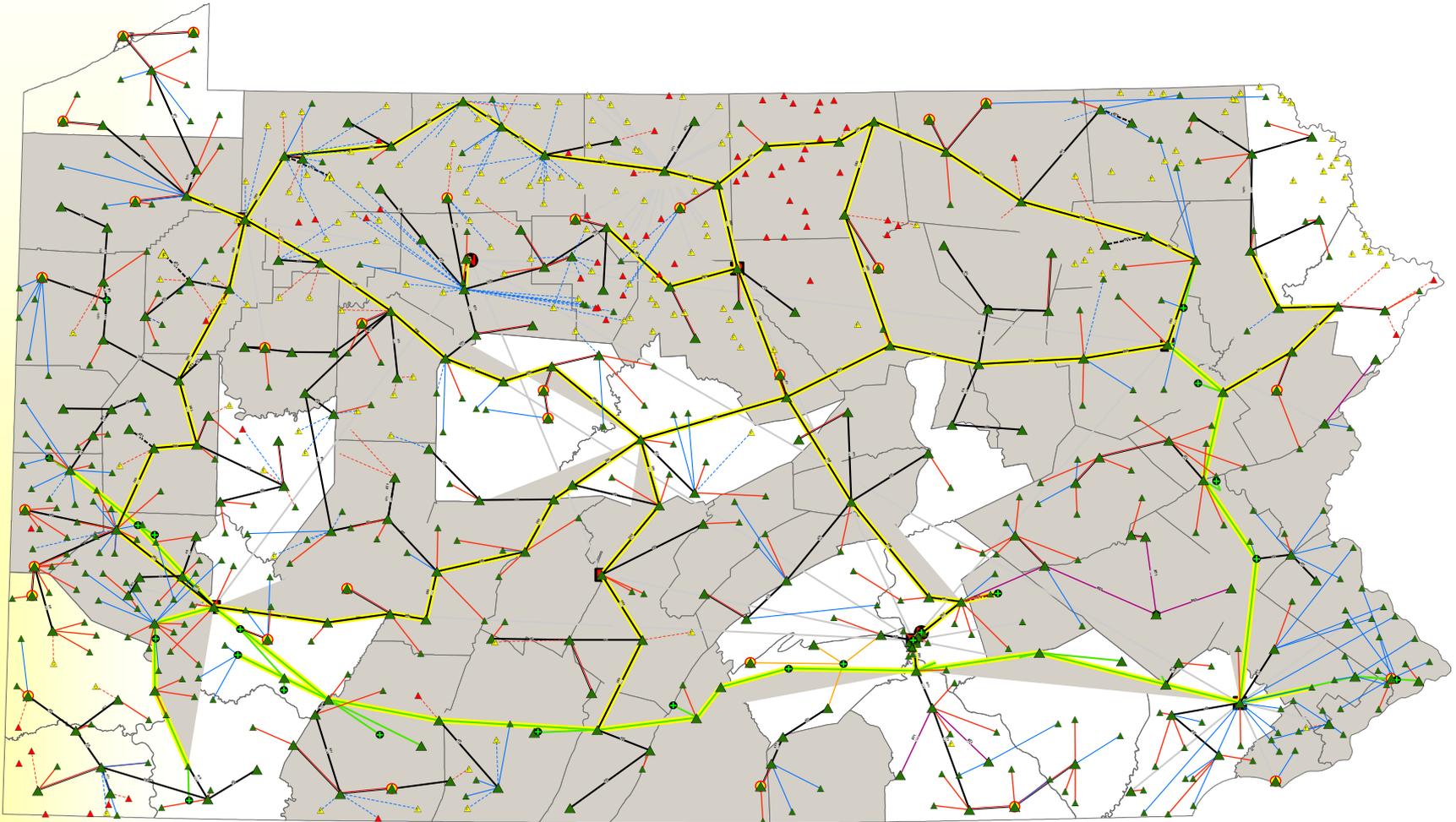
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## *With Coverage From Sites in Development*



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## *Statewide Data Transport Network*



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## *Pennsylvania State Police Mobile Office*



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## *Tower Site*



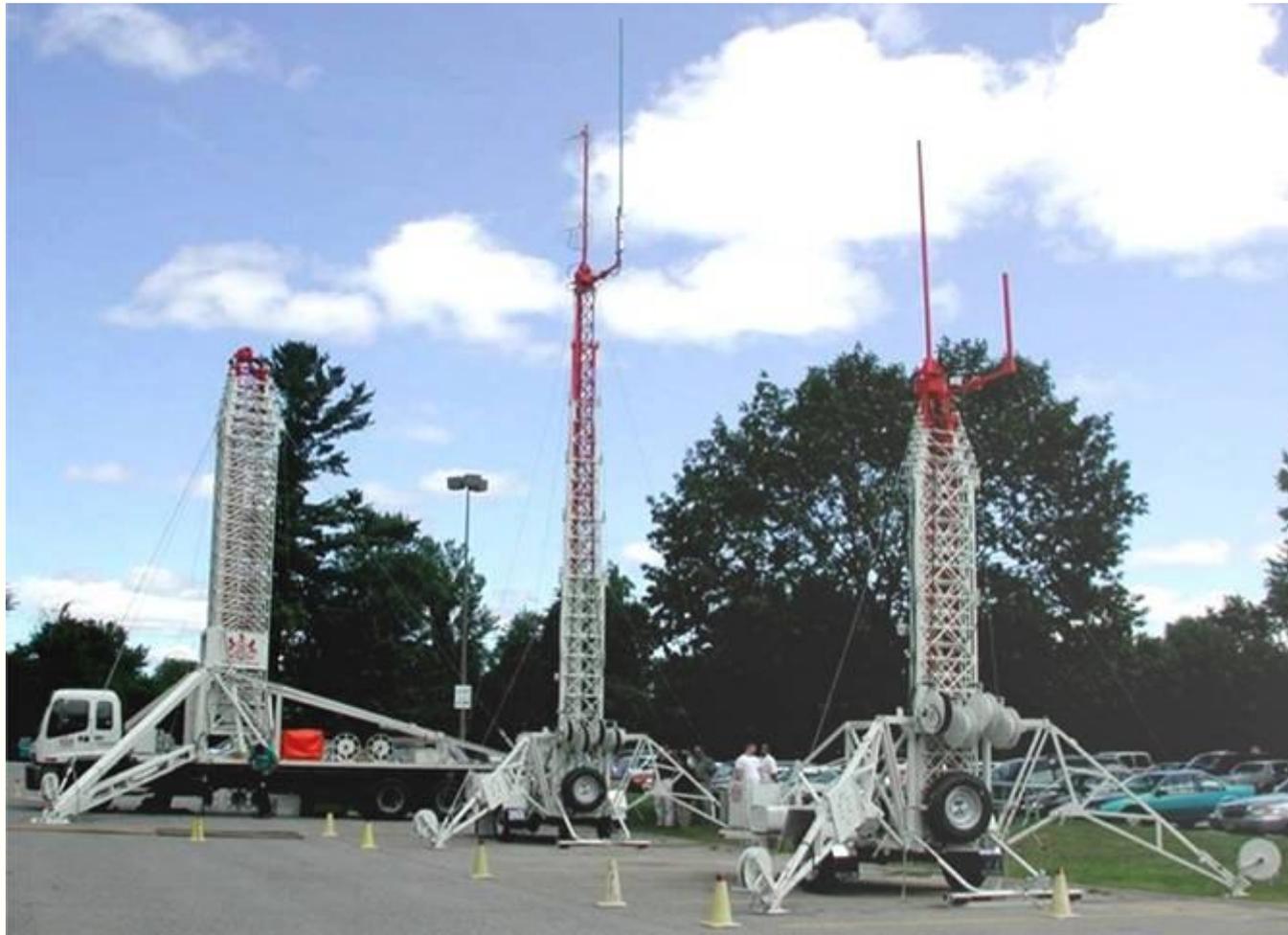
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## *Microcell Site*



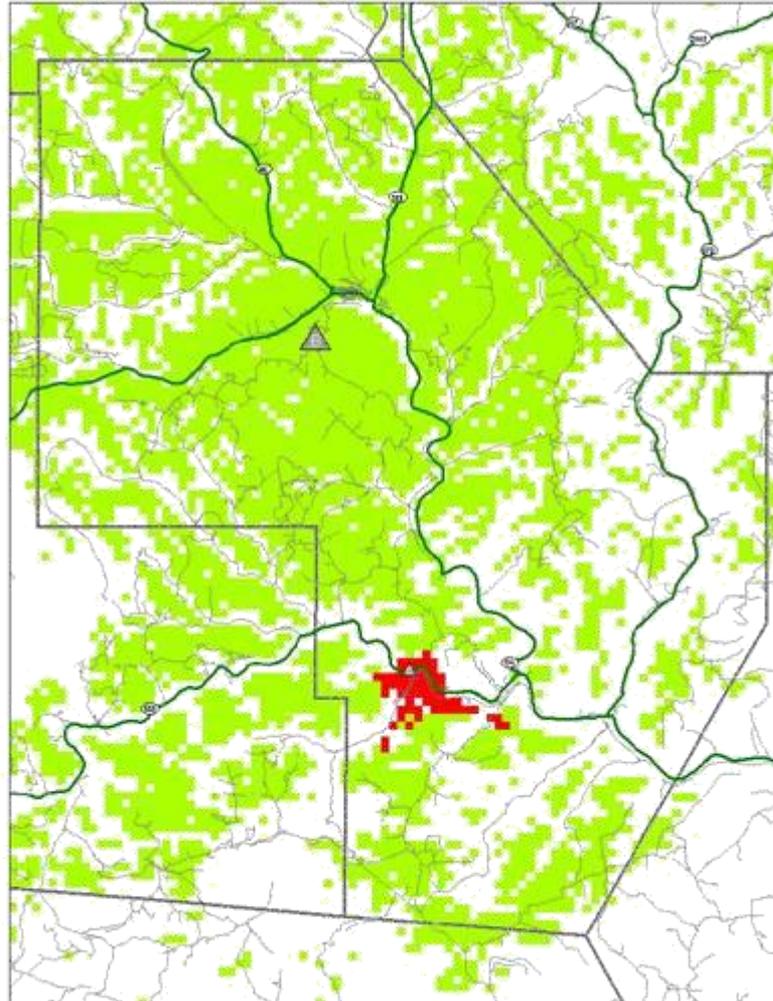
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## *Cell on Wheels (COW)*



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## *Tower vs. Microcell Coverage*



### **Cameron County**



Tower Site



Micro-Cell Site



Tower Site Footprint



Micro-Cell Footprint

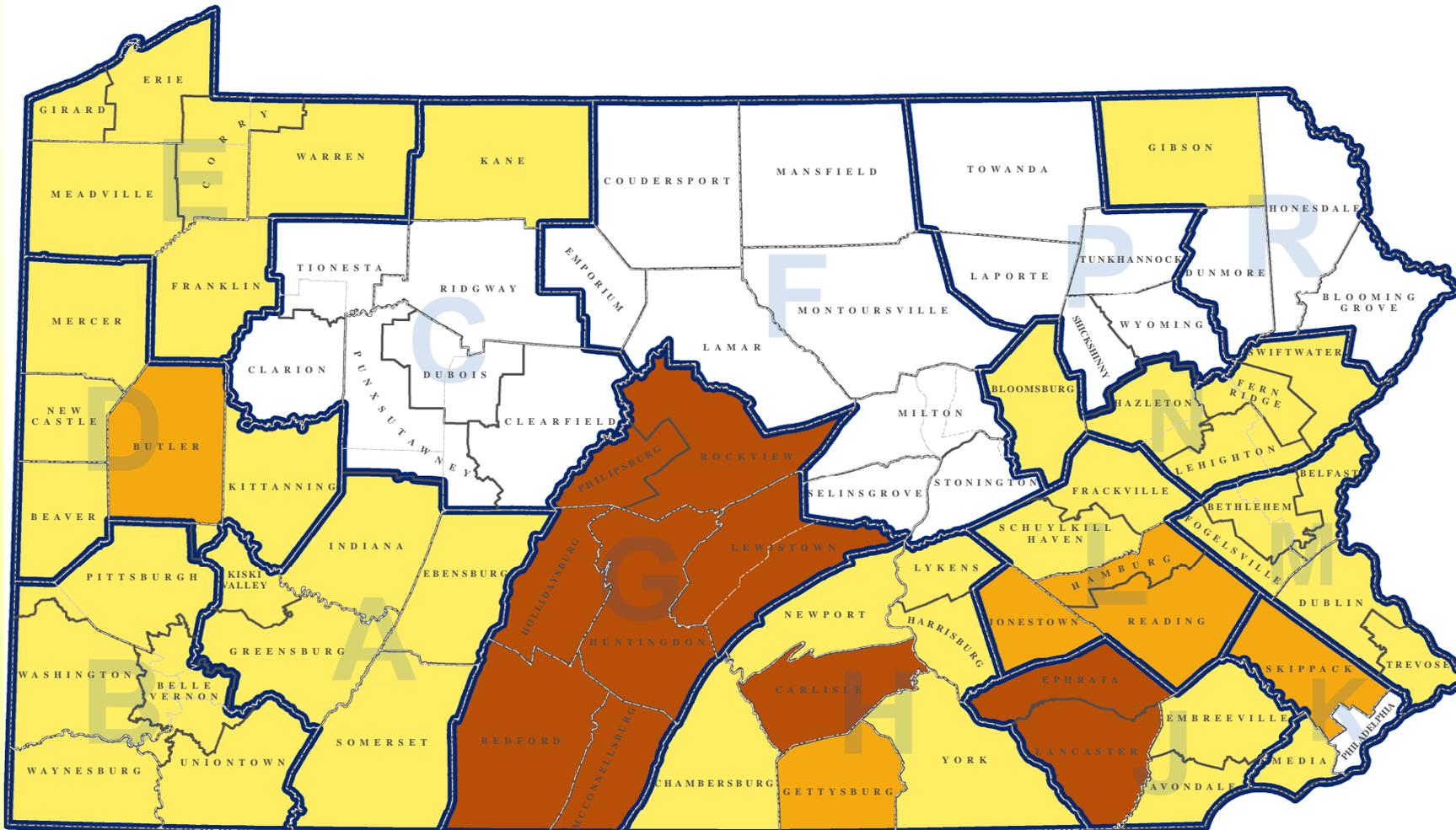
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## *PennDOT Radio Deployment*



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## State Police Radio Deployment



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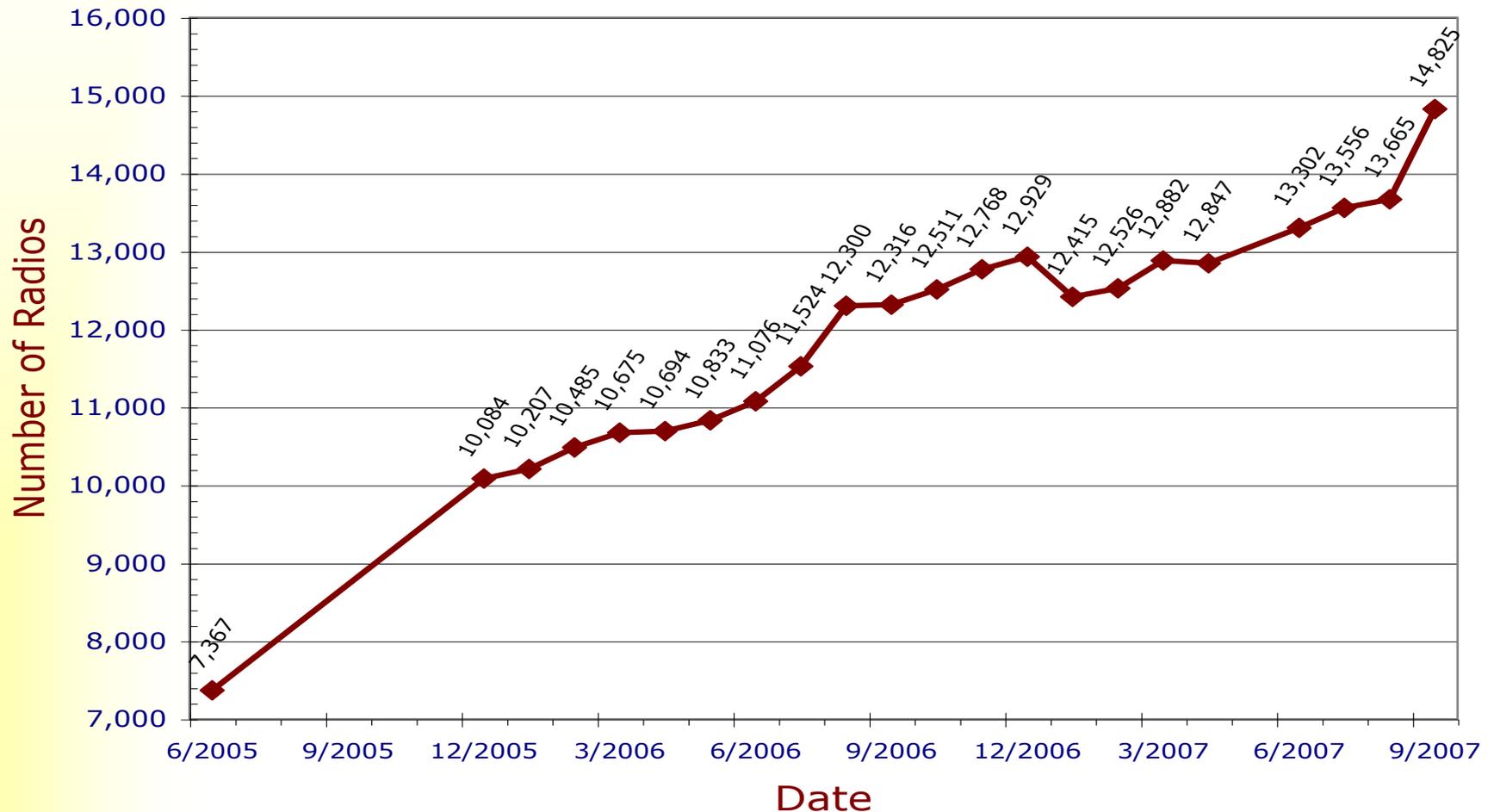
## Mitigation of Radio Frequency Interference



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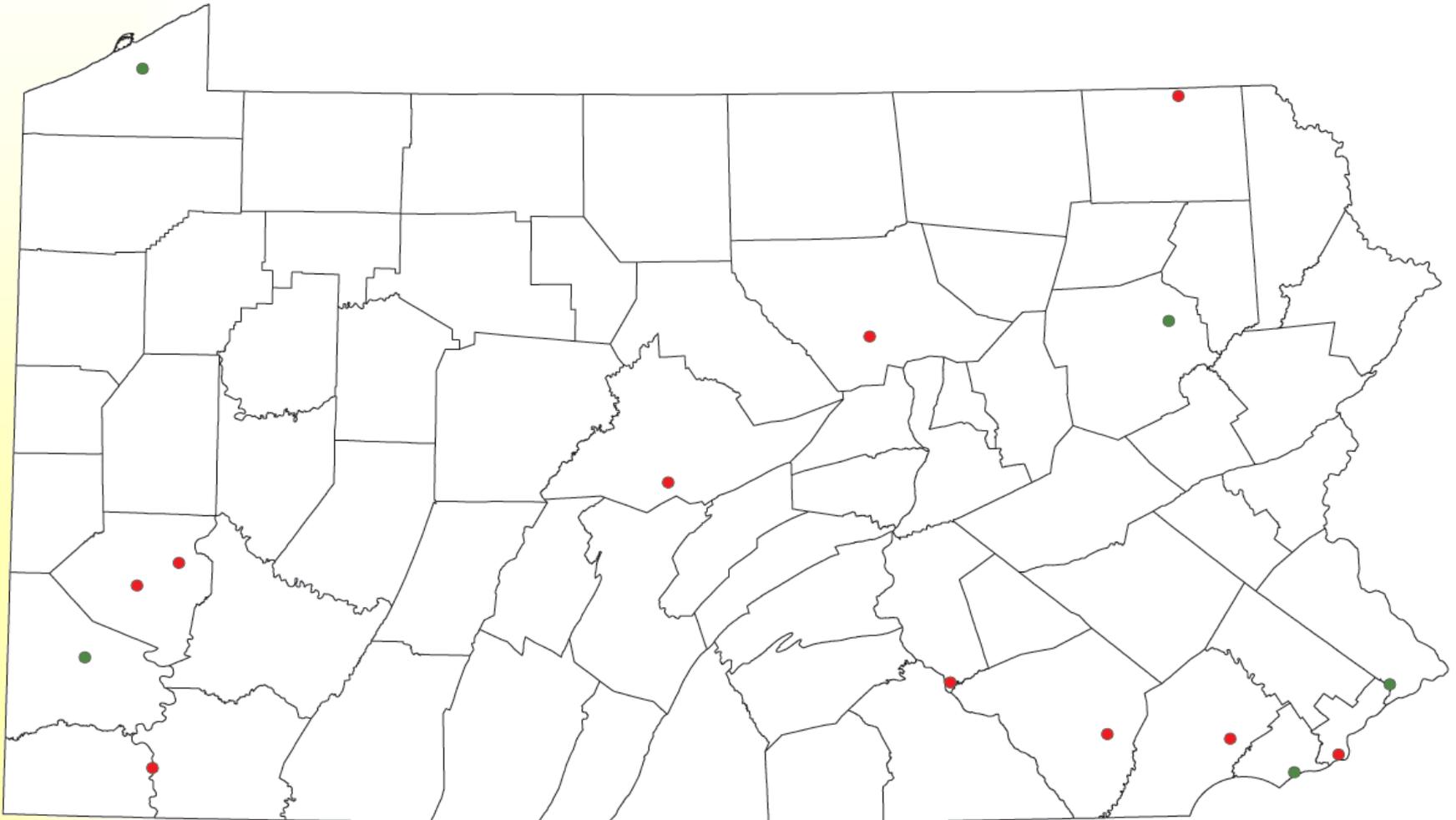


## Radios Authorized for System Use



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## *Examples of System Use*



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## *Agencies Using PA-STARNet*



- Department of Transportation
- Office of Attorney General
- Department of Health
- Pennsylvania Emergency Management Agency (PEMA)
- Pennsylvania Board of Probation and Parole
- Department of Military and Veterans Affairs
  - Civil Air Patrol
- Department of Environmental Protection
- Department of Corrections
- Pennsylvania State Police
- Public Utility Commission
- Office of Administration
  - Public Safety Radio Services
  - Administrative Services
- Pennsylvania Department of Agriculture
- Legislature
  - House of Representatives Security
  - Senate Security
- Department of General Services (DGS)
  - Capitol Police Department
  - Fire, Safety, Maintenance
- Pennsylvania Turnpike Commission
- Department of Conservation and Natural Resources
- Office of Homeland Security

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## Budget: History of Expenditures

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## *Timeline, Capital Appropriations*

### Project Beginning

- 1997: \$179 million in Act 148 of 1996
  - 1999: \$43 million in Act 35
  - 2000–2003: \$15.6 million augmented from operating funds
- Total \$237.6 million

### Additional Appropriations

- 2004: \$10.5 million augmented from operating funds
  - 2005: \$3.9 million inflationary increase
  - 2005–2006: \$59 million in Act 40 of 2004, Act 83 of 2006
- Total \$73.4 million

Cumulative Total: \$311 million (\$238M + \$73M)

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## *Timeline, Capital Expenditures*



**July 2003** \$221 million total usage

- 123% of original \$179 million appropriation
- 61% coverage, or 27,000 square miles

**July 2007** \$296 million total usage

- \$75 million additional usage
- Increase from 61% coverage to 91% coverage

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## *Costs in Perspective*



### Pennsylvania State Police (PSP): SE Technologies Study, January 1995

- PSP to be project manager for new 800 MHz radio network
- Pennsylvania estimated to need 298 sites
- Total cost estimated at \$380,967,962
- At 3% per year inflation = \$560 million today

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## *Comparison With County System Cost*



Six systems purchased since 1998:

- Cumberland County - \$6 million
- Dauphin County—\$25 million
- Lancaster County—\$20 million
- Lebanon County—\$10 million
- Philadelphia County—\$50 million
- York County—\$32 million

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## *Comparison With County Systems (cont'd)*



Six systems purchased since 1998:

- Combined cost: \$143,000,000
- Combined land area, square miles: 3,500
- Average cost per square mile: \$40,000

Cost if PA-STARNet was built  
on these assumptions:

\$1.8 billion

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## Project Challenges: Historical Perspective

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## *iXP Findings, 2004 Study*



- Major Risks:

- Commonwealth acting as its own integrator

- Deploying a system with no prior history in installations of this size

- No legislation changes to expedite the site acquisition process

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## *Cost and Schedule Drivers*

- Commonwealth decision to build rather than buy a radio system
- Commonwealth decision to become the integrator
- Commonwealth decision not to hire a site acquisition firm
- Bankruptcy of tower site construction firm (Rohn)

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## *Cost and Schedule Drivers (cont'd)*

### Additional requirements not in original contract:

- Extensive new requirements for interoperability with counties
- Nextel interference and FCC rebanding requirements
- Commonwealth did not include specifications for roadway coverage or coverage for:
  - Schools, hospitals, nuclear power plants, PNC Park, Little League World Series, Beaver Stadium (Penn State), tunnels, military indoor portable coverage (Fort Indiantown Gap), unique agency requirements



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## What the System Can Do

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## *Conventional bandwidth use*

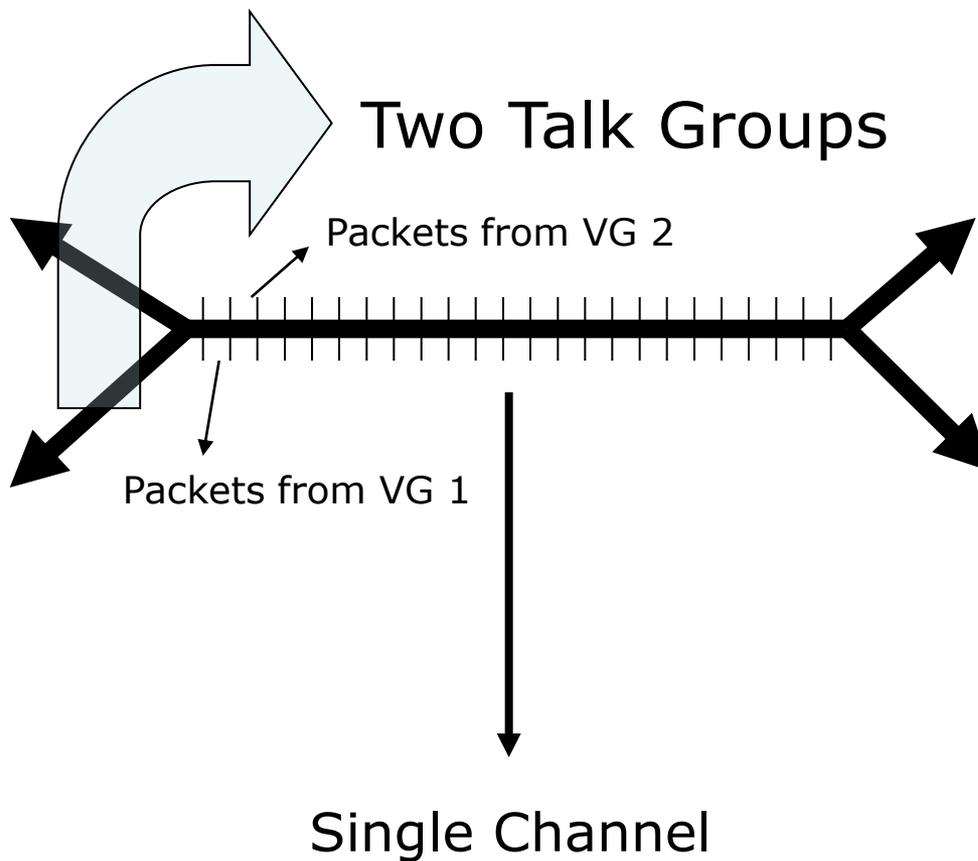


Single Channel

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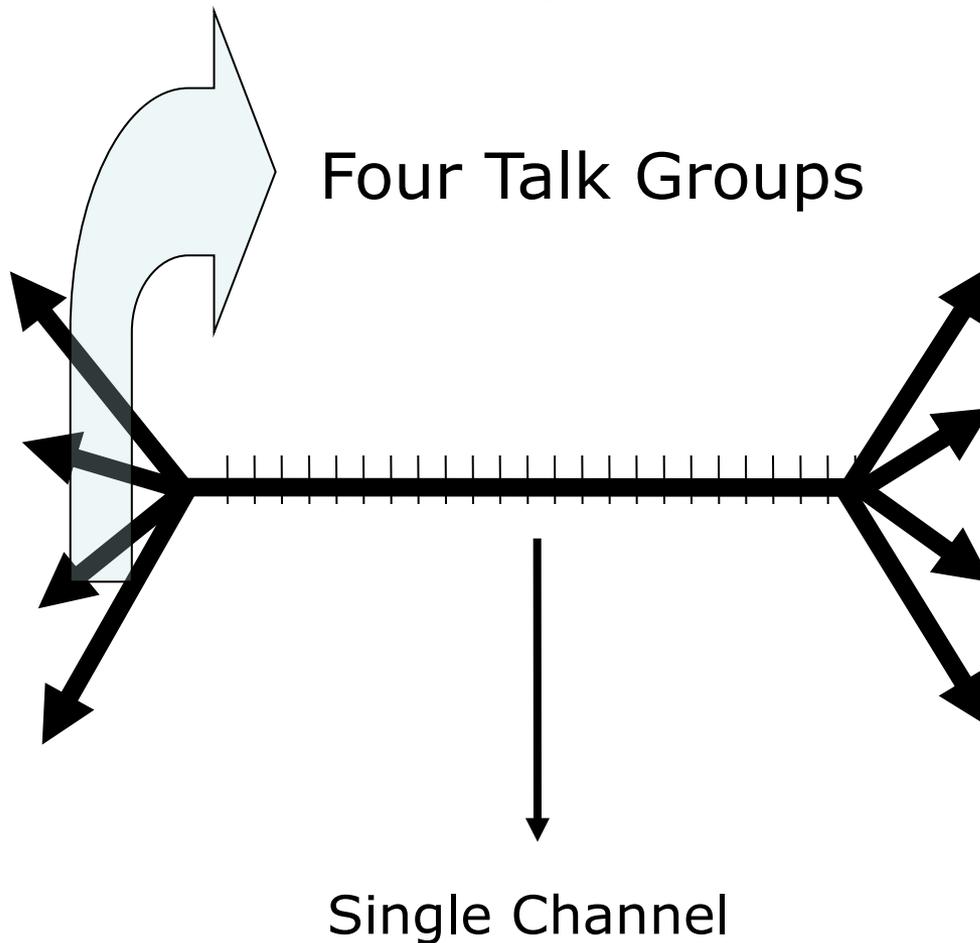
## *TDMA two-slot technology*



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## *TDMA four-slot technology*



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## *Some Unique Features*



- Radio on a PC:  
VIP Console
- Vehicular Tactical Repeater: VTAC
- Off-network capabilities
- Over-the-Air Reprogramming: OTAR
- TDMA two-slot and four-slot technologies



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## County Interoperability



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## *Looking Forward.....*



- Transition more PSP stations and more agencies
- FCC rebanding mandates
- Continue higher pace of construction and installation of microcell sites
  - Coverage along state and township roads.**
- Interoperability with 67 Pennsylvania counties through 911 centers

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